# TECHNICIAN ENGINEER

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INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS — AFL-CIO

# Minimum Wage "Floor" Reaches Dollar Mark

## March 1, 1956

The battle for decent wages has been a long one and the struggle to bring up wages of American workers has found one of its most effective expressions in the Fair Labor Standards Act. The first minimum wage law set a 25-cent minimum hourly wage which applied to workers of many industries engaged in work of interstate character. The first Act became effective October 24, 1938. Six years later the minimum became 40 cents.

Through the years of struggle the labor movement has sought to increase or raise the floor on wages and to lower the ceiling on hours. In addition to the wage-hours provisions, the Act also contains certain child labor protections.

On October 26, 1949 the Act was again amended, this time raising the minimum to 75 cents per hour, extending child-labor coverage, increasing coverage and making other improvements.

On August 12, 1955 the Amendments of 1955, effective March 1, 1956, brought the "floor" to $1.00. This level was regarded as an important step in the long effort to bring a measure of justice to America's low-paid workers.

While the dollar minimum seems modest by current standards, it represented the achievement of a level which had to be won after a long and bitter fight. The problem which labor has is that of extending the scope of the wage-hour legislation and coverage and while we have a long way to go, under present day needs, the attainment of the dollar level was indeed a labor accomplishment well worth noting.

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# TECHNICIAN ENGINEER

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## the cover

*The Voice of America's beat, like its audience, covers the world. This February, the Voice turned 25. Born out of the necessity to reach inside the borders of the enemy powers during World War II, it has become an extension of American foreign policy, helping to shape the course of emergent democracy while it reports the turn of world events both bad and good. Behind the scenes are many IBEW engineers. In the cover picture, La Paz Correspondent Oscar Lora (with mike) puts on tape the feelings of a Bolivian woman and her daughter who had just walked seven days to a new home in North-Central Bolivia. For the anniversary story on the Voice, see page 4.*

## index

*For the benefit of Local Unions needing such information in negotiations and planning, here are the latest figures for the cost-of-living index, compared with the previous year: January, 1967—114.7; January, 1966—111.0.*

## commentary

*Washington—AFL-CIO Pres. George Meany has called on the labor movement for renewed efforts to assure fair treatment of unions by radio and television stations under the Federal Communications Commission's rules.*

*In a letter to all state and local central bodies, the AFL-CIO president declared that "continued flooding of the air waves with rightwing propaganda requires that the trade union movement increase its efforts to counter unfair telecasting and broadcasting."*

*He agreed that it is "very difficult" for a union to meet two of the five informational requirements the FCC expects from a complainant under its "fairness" doctrine—"the basis for the claim that the station has presented only one side of the question, and whether the station has afforded, or has plans to afford, an opportunity for the presentation of contrasting viewpoints."*

*But "despite these difficulties," Meany advised the central bodies, the effort should be made to secure the opportunity for presentation of labor's views.*

*"If a television or radio station in your area carries a personal attack upon a union or union official, the organization or individual involved should demand time to reply," he wrote.*

*"If the station refuses, prompt complaint should be made to the FCC. This can be done simply by sending a letter setting out the details to the FCC. . . . In order that the AFL-CIO may be in a position to follow up, a copy of the letter should be sent to Albert Zack, director, Dept. of Public Relations, AFL-CIO.*

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*Below, the high-speed tape decks in the Voice Washington studio process more than 50,000 recordings each year. Subject material ranges from interviews to musical programs.*

*Two technicians are on duty around the clock(s) at the master control board, which never fails to impress Washington tourists. A total of 26 programs can be fed to the Voice transmitters, and all channels can be switched at one time.*

**The Thai peasant** sloshes slowly through a rice paddy, cultivating with a crude wooden plow pulled by a water buffalo. Nearby is a transistor radio, tied to a sharp stick jabbed into the mud of the paddy. In the South American wilderness, a boatman listens to his transistor radio as he floats down the Amazon.

The medium is the radio, and the message is America—entertaining, factual, unbiased Americana—going out to diverse cultures that make up the family of earthly man through the Voice of America. No membership card is necessary. A radio, and an inclination to be well-informed and entertained is all that is required.

For 25 years, this February 2, the Voice has been getting its message across with the convenience and immediacy of the airwaves, and the world has learned in this time to rely on the Voice for news that is fast, complete, and objective. In times of international stress, the audience increases substantially as millions more tune in to hear what the official radio of the United States has to say. A lot of political and technical water has gone over the dam since that first broadcast, but the philosophy is unchanged.

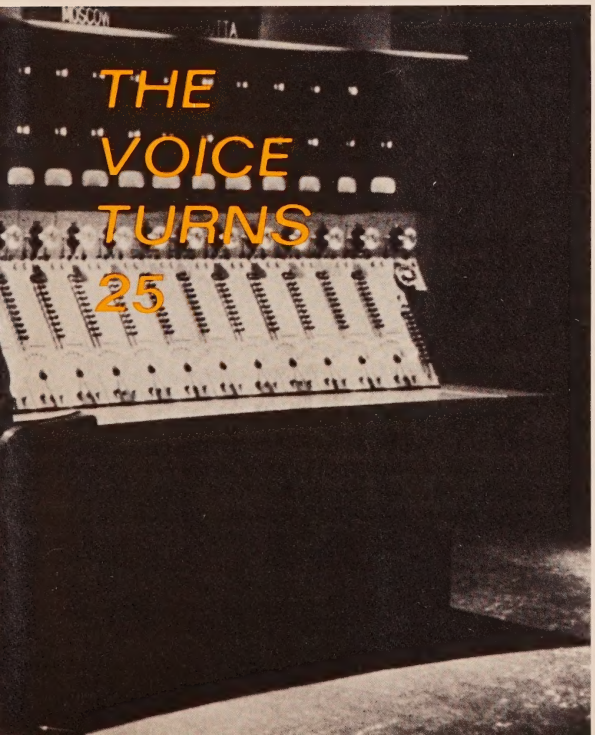
It was in German, and the opening words were "The Voice of America Speaks. Today, America has been at war for 79 days. Daily, at this time, we shall speak to you about America and the war. The news may be good or bad. We shall tell you the truth."

The initial work of the Voice involved regularly scheduled programs in English, German, French and Italian. Today, from studios in Washington, it broadcasts in 38 languages, producing almost five weeks' worth of consecutive air time in one. This represents more air time than all three of the major U.S. networks combined. To do this, it uses a worldwide network of 92 transmitters, and total equipment worth close to $168 million. Manning the consoles in many of these locations are technicians of the IBEW.

The starting point for most of the program material is the newsroom in Washington, where seasoned pros rewrite the endless stories coming in over the major wire services' machines and from the Voice's own correspondents and checks each story with at least two reliable sources. The news reports then go to a small United Nations of translators who give the Washington headquarters of the Voice a distinctive international flavor. News is combined with music and feature material, shaped into programs, and committed to tape and disc. In Washington, as many as 63 tape and disc recordings can be made simultaneously. There are countless tape-editing booths, music and transcription libraries, and 23 complete sound studios.

Master Control in Washington is a perpetual wonder to the tourists. Clocks keep track of time in Bangkok, Tokyo, Honolulu, New York, London, Moscow and Calcutta, and technicians at the console can select material from 100 sources. A total of 26 programs may be handled simultaneously.

*Born in wartime necessity, the Voice of America has matured in 25 years. A respected reporter and welcome entertainer, it leapfrogs international boundaries.*




The programs are fed through special telephone circuits and by microwave to short-wave transmitters in the United States, from which they are broadcast to any one of the high-power relay stations overseas. These relay the programs directly to the listeners on either short or medium wave bands, whichever are more popular for broadcasting in the receiving area. Besides these direct broadcasts, Voice of America programs are picked up and rebroadcast by hundreds of local stations overseas, especially in Latin America.

In setting up the global system, the Voice had to overcome three major technical problems. First was the signal damage wrought by the North Auroral zone, an area of heavy auroral activity that has a circumference roughly equal to the arctic circle, but which is skewed slightly Southeastward from the geographic pole, centering on the magnetic north pole. An attempt to get a signal routinely over the pole and into the Soviet Union and China would be thwarted by the auroral activity.

The second problem was the simple distances involved in blanketing the world with transmissions. The third was the obvious challenge of communist-bloc jamming, which began in 1948 to obliterate the Voice signal in The Soviet Union and its satellites, and most recently, in China and Cuba.

This last problem resolved itself, at least as far as the Soviet Union is concerned. Several years ago the Soviet Union, Rumania, Hungary, Czechoslovakia and Poland stopped their jamming of the Voice, and still let it through. Red China, Cuba, and several other communist countries, however, continue.

Both distance and auroral zone problems were circumvented by the use of powerful master transmitters in the U.S.. and numerous relay sites overseas. Today there are five transmitter sites in the U.S.—at Bethany, Ohio; Delano, California; Dixon, California, Greenville, North Carolina, and Marathon, Florida. In Europe, Asia and Africa, 11 relay stations shunt the signal around the auroral zone, and bridge the vast distances in the net.

All of the relay stations are different, tailored to the job. In Munich, Germany, the location is close enough to the Central European target that medium wavelengths can be used as well as short. The relay there has four shortwave transmitters, ranging in power from 75 to 100 kw, and several lower-power transmitters. Operating on 1196 kHz (formerly kc) is a 300 kw medium-wave transmitter. Seventeen shortwave antennas are used for Europe, Eurasian Soviet Russia, the Near and Middle East and parts of Africa. Before the Russians quit their jamming, there was a superpower long-wave transmitter. It radiated a megawatt from a single top-loaded tower over 900 feet high, on 173 kHz (kc).

A relatively small station in Thessalonika, Greece, is close to the Balkan target area, and uses four 35 kw shortwave transmitters and a 50 kw medium-wave transmitter on 791 kHz (kc). Twelve shortwave antennas cover the Balkans, the western Soviet Union, East Europe, and the Near and Middle East.

Thessalonika imports its signal from what may be the most powerful radio transmitting facility in the world—the Voice's stateside transmitter at Greenville, South Carolina. Although Greenville provides a direct signal to African and Latin American listeners, it also serves as a feed to the relay stations in Africa and the European Mediterranean, such as Thessalonika. There are 18 broadcast and 4 communications transmitters at two separate locations, a program receiving and distribution center at another, and 64 elaborate antenna systems. The total energy output is on the order of 4.8 million watts.

VOA also has portable trouble-shooters—van-mounted units that can be flown quickly into trouble spots. When the Cuban crisis developed, for example, a medium-wave transportable station was on the test floor of the manufacturer. Within a matter of weeks it was completed and relocated in the Florida Keys, transmitting with a directional antenna system to Cuba.

Construction of new facilities and the modernization of existing equipment is constantly being carried out by Voice of America engineers in their efforts to provide better reception. Since the dedication of Greenville in 1963, VOA has added a new transmitter in Florida which broadcasts Spanish programs toward Cuba. New facilities currently under construction in Southeast Asia will produce a far more powerful signal, assuring listeners in India and Pakistan of better reception in the not too distant future.

The network of transmitting and receiving equipment that is supervised and operated by VOA engineers uses more electricity than all the commercial radio stations in the U.S.

But power, important as it is in broadcasting, is not the only factor that determines the success of the Voice of America during its more than 800 hours on the air each week. Equally important is the recognition of the intimacy of radio broadcasting and of the fact that basically the Voice of America exists mainly to allow one American to communicate with one citizen of another country. Although some people listen to the Voice of America in cafes and markets, by far the greater part of the broadcasting involves only one or two listeners at a time.

The Voice explains the position of the U.S. Government in news analyses and commentaries as well as special broadcasts by the President, the Secretary of State and other officials. In keeping with its policy of presenting both sides of all questions, it also broadcasts the views of the opposition. These often take the form of editorials in the American and foreign press, radio and television, and include their criticism of U.S. policy in Vietnam as well as comments on race relations.

The views of visitors from overseas often are presented on VOA broadcasts. Government officials, teachers, students, artists, scientists and businessmen are among those telling listeners in their homelands about their experience in the United States and about the Americans and their way of life.

On the domestic scene, features, coverage of special events such as rocket launchings at Cape Kennedy, interviews, round table discussions, documentaries and reports from VOA correspondents form an important part of the programming. Every facet of American life is examined: education, labor, economy, agriculture, politics, science, culture, community relations. One of the most respected programs is a series of lectures called "Forum," in which American authorities in education, political science, agriculture, demography, the arts and other fields talk to their counterparts abroad on a high level.

Music—ranging from the sprightly "Yankee Doodle" that is the new theme song of the English-language programs, to serious compositions by contemporary composers—is included in almost every program. The most popular single series is undoubtedly "Music U.S.A." which recognizes the worldwide interest in American jazz and popular music. Broadcast by Willis Conover for approximately 13 years, it has in that time acquired one of the largest audiences in international broadcasting and made Mr. Conover the idol of young people on his visits abroad.

A special effort is made to communicate with the more than a thousand million persons in the world who speak English as a second or third language. This is done through the World Wide English Service on which many of the programs are read more slowly and distinctly than is customary in programs of American commercial stations.

In addition, since 1959 daily news and features in "Special English" have been broadcast to all parts of the world for those who are just learning English. Developed by language experts and government officials, it uses a simplified vocabulary—the word list is available abroad in book form—and is spoken at a much slower pace than the regular English language programs.

The latest development in the Voice of America is the "new sound" which was inaugurated in November 1966 over the English Service and is being extended to the other languages. A swift-moving informal blend of world news, features, music, weather reports (obtained from America's orbiting weather satellites) and comedy, each block of programming aims to be, in the words of John Chancellor, director of the Voice of America, "vigorous, amusing, avant-garde—the first with the latest."

As the "new sound" continues its lively way, ushering in the second quarter century of the Voice of America, the "transistor revolution"—the increasing production and sale of low-cost transistor radios throughout the world—continues to shape a new chapter in communications. When people want information, they turn to their radios as the easiest and quickest way of obtaining it.

The Voice of America, for its part, intends to continue providing this information and through it programs further better relations among the nations of the world.

# THE LABOR-MANAGEMENT WHIRL

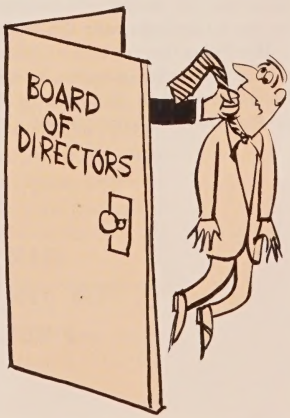
*As reported by* Les Finnegan in CAVIL-CADE, *distributed by* Press Associates, Inc.

• *IN JERUSALEM, Israel's labor government won the enthusiastic loyalty of the country's artists. Painters and sculptors, living in the Galilee artists' colony of Safed, were officially exempted from paying taxes, at least money taxes. Instead the artists will "tax" themselves paintings and statues which will be prominently displayed in public buildings.*

• *IN SAN FRANCISCO, a small manufacturing company, according to Nuggets Magazine, had a small stray dog as an honorary vice-president. A company spokesman explained, "His ability to get along with anyone; his prompt response to a pat on the back, his interest in watching others work, and his great knack for looking wise and saying nothing, makes him a natural."*

• *IN TOKYO, JAPAN, union truck drivers were up in arms over a new promotion scheme dreamed up by a sake manufacturer. With every purchase of the de luxe special grade of sake—rice wine—the buyer receives free a traffic accident insurance policy worth $1389. If he buys a cheaper grade sake he gets a policy for $833. The union truckers complained, "There are enough inebriated drivers on the road now; insurance policies will just encourage them."*

• *IN SAN FRANCISCO, college snobbery—the "old school tie" that Americans thought only the British were guilty of—rules American big business and industry. This was the conclusion drawn from a study of 876 directors on the boards of 52 of the largest U.S. companies. The study, made by Dr. Stanley C. Vance and reported in the California Management Review, found that more than one-third of the outside directors in the largest manufacturing firms, banks and insurance companies were chosen because they attended just one of three universities. The schools are the elite Ivy League institutions, Harvard, Yale and Princeton. According to Dr. Vance, if you want to sit on the board of directors of a major corporation your chances are one in 49 if you were graduated from Harvard, Yale or Princeton, but your chances are only one in 18,750 if you got a sheepskin from some other school.*



# BLIND UNION MUSICIAN IS THE OUTSTANDING HANDICAPPED AMERICAN OF 1966

by Press Associates, Inc.

Art Edgerton, a blind radio-TV newsman and jazz musician whose roots go deeply into organized labor, has been named Handicapped American of the Year for 1966 by the President's Committee on Employment of the Handicapped.

He will receive the President's trophy at the Annual Meeting of the President's Committee on April 27, 1967 at a ceremony in Washington, D. C. The trophy is a mahogany and silver plaque made by the students of the Institute for the Crippled and Disabled in New York City.

Edgerton is a member of Musicians Locals 286 and 77. He has been a union member since the age of 15—he is now 38—entering the union in Philadelphia where he was a member of the Philadelphia Youth Orchestra.

His father before him—Clifford Edgerton—also was a long time union member, being a member both of the Longshoremen in the Port of Philadelphia and as a professional Musician himself.

Art Edgerton doubles both as a radio and TV news reporter and as music director for station WTOL, Toledo. He writes the news for late night and morning broadcasts and has developed his own news gathering methods. His work includes out-of-town assignments.

Assigned to cover the 1963 March On Washington by civil rights groups, he amazed the press contingent—including network newsmen—with his ability to cover the news at the scene and report it as it developed.

Life was not easy for Edgerton, who was born blind to a Philadelphia family of limited means. His parents were ill constantly as a result of the hard living conditions of the area.

After graduating from high school, Edgerton went to St. Joseph's College in Philadelphia, graduating with a BA degree in Sociology in 1950. He received his MA in Sociology from Fordham University in New York City in 1951.

But music was Edgerton's first love, due primarily to the influence of his father who led a jazz group in Philadelphia. So, while working on his Master's degree, Edgerton went to classes at the Juilliard School of Music, where he received a BA degree in music.

During his high school days, Edgerton played with the Philadelphia Youth Orchestra under Eugene Ormandy. In 1944-45 Edgerton toured the service camps with the bands of Count Basie and Lionel Hampton.

When he was not quite 30, Edgerton arrived in Toledo with a jazz combo that was touring the midwest and western states. When they finished the Toledo engagement, the group disbanded. Stranded in this strange city, Edgerton surmounted many staggering obstacles to find work as a part-time teacher of music.

Later he went to work as Musical Director of WTOL on a part-time basis and convinced the station of his ability. Edgerton got into the news side of radio and television through his close association with newsmen.

Edgerton was cited for his determination and the outstanding example he has set for other handicapped persons. In addition, he has been extremely active in Toledo and in Ohio in promoting employment of the handicapped.

**ONE OF THE FIRST**

This agreement is reported to be an authentic relic of the year 459 A.D,. uncovered by an American Archeologist named Buckler, before World War I in the forum of Sardis. The city was an important crossroads of Asia Minor in early Christian times. The agreement was between the Roman proconsul and the Sardis Building Trades Crafts. The craft unions have, in fact, been around far longer than the Sardis group. Records show craft unions in China in 5,000 B.C., and they were covered by Roman law in the 6th century, B.C.

# THE SARDIS BUILDING TRADES AGREEMENT

## A.D. CDLIX

Declaration Under Oath by the Builders and Artisans of the Most Distinguished Metropolis of the Sardians:

In the consulship of the most distinguished Flavius Patricus and of the consul who shall have been proclaimed on the fifth before the calends of May, in the most distinguished metropolis of the Sardians twice honored with an emperors temple, in the twelfth most happy indiction and on the fourth of the month Daesius, we give the most excellent Aurelianus, devoted commissioner and defender of the said renowned metropolis, our assent to the things hereinafter set forth:

Whereas your excellency has received divers accusations against divers persons practicing our craft, to the effect that they take in hand pieces of building work, leave these unfinished and obstruct the employers, deeming it important to abolish an injustice so detrimental to the employers, you have requested from us this agreement and declaration under oath in the following terms:

"We do agree and make oath by the holy and life-giving Trinity and by the safe perservation and victory of the Lord of the inhabited earth, Flavius Leo, everlasting Augustus and Emperor.

"(1) That we will complete all pieces of work given out to us by anyone of the employers, provided the employer is prompt in paying to us the wages mutually agreed upon:

"(2) Should the man undertaking the work have any plea on which he declines it for some reason of his own, either private or public, another artisan from among us shall take his place and shall entirely complete the work under construction, on the distinct understanding that the man declining it, whether he be the Artisan who began it or the man who shall have taken his place, is one of ourselves, and that no reason of our own stands in the way of the work;

"(3) Should the man undertaking the work once hinder the employer in any way while it is, as we said, under construction, if he who either began it from the beginning or shall have taken the place of any artisan is one of ourselves, we shall for such hindrance pay indemnities according to the actual contract between employer and the artisan;

"(4) Should the employer show indulgence, if he be for seven days hindered from working, the work shall be left to the artisan undertaking it;

"(5) Should the artisan fall ill, the employer shall wait twenty days, and if after such indulgence for twenty days the man shall get well, but show no disposition to work at that time, another shall take his place on the terms stipulated by us as the man who has declined;

"(6) If, when the man undertaking the work declines it, some one of us be found neither doing anything nor performing work in accordance with the provisions herein written, we bind ourselves to pay.....(sum) as a fine to be used by the city's public works, while the artisan shall be compelled to pay eight pieces of gold, and shall further be liable, even after exaction of the fine, to prosecution under the divine edicts on the charge of injustice; the present agreement remaining firm, unbroken and undisturbed in perpetuity, and being irrevocably carried out in strict conformity with all things above determined and promised by us;

"(7) And for the full discharging of the fine we pledge, under a lien both general and individual, all our property present and future of any kind and sort."

And when as to all things above written the question was put to us by your excellency, we gave our assent to this agreement and declaration under oath on the day and in the consulship above written.

# THAT'S ABOUT THE SIZE OF IT . .

RRRRRRiiiiiinnnnnngggggg! A hand reaches out to shut off the alarm. A measured amount of time having elapsed during the night, the head of the household arises and gets ready to go to work. He is oblivious to the fact that the motor in his clock operates accurately only because the current coming into the house is sixty cycles per second; not fifty cycles, not seventy cycles, but **exactly** sixty cycles per second. Nodding over his second cup of coffee, listening to the music and chatter on the radio, he doesn't realize that each station in his area must broadcast on **exactly** 570 kilocycles or exactly 1450 kilocycles or exactly 890 kilocycles, etc., in order for him to receive a separate, single station and not a conglomerate cacophony of words and music.

On the road now, musing, over his wife's instructions to bring home three pounds of potatoes and four quarts of milk, he is suddenly brought up short at the sight of the familiar yellow school bus, and he automatically puts his foot on the brake. That shade of yellow would alert him anywhere in the country because it is based on a standard, measured color designed specifically for school buses. As he continues, his eyes idly range over the array of dials on the dashboard, indicating the temperature of the engine, the pressure in the oil system, and the amount of gas in the tank.

This is measurement at work, in the uncountable applications that each of us encounter each day. We take it more or less for granted, but without this kind of a system of order, our society today simply wouldn't work.

**measure . . . measure . . . measure**

It has been estimated that more than twenty billion measurements are made in this country each day—in science, industry, commerce, and everyday life. Who makes all these measurements? Who uses them? The answers are that we all make measurements, and we all use measurements. In support of all these measurements the nation has an investment of about $50 billion in instrumentation and research and development related to measurement. Measurement activities, however, are not always obvious. They frequently occur far in the background, much like the mathematics which underlies and makes possible modern computers.

What makes this $50 billion investment worth while? We could have spent the $50 billion on an underwater tunnel to Europe, or to install weatherproof domes over our cities. The fact of the matter is that no individual, no committee, no institution simply decides by itself that we should have a $50 billion investment in measurement. In our free society the number of measurements made; the size of the nation's investment; the extent of our national measurement system; are all determined through the individual decision of hundreds of thousands of people; scientists, engineers, businessmen, industrialists, entrepreneurs, and people in everyday life. All of these people need answers to questions — questions of "how much?"

The vast extent of our measurement activities testifies to the scientific and technological nature of modern society. In fact, one could almost evaluate a country's general level of development by the status and capabilities of its measurement system.

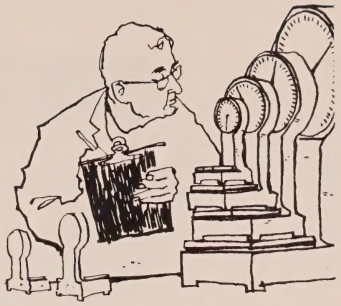
**by agreement**

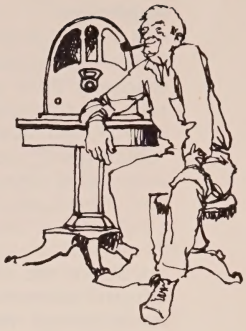
It is vital that everyone using the same system agree on the units and the standards. Otherwise, results of measurements made by one person would have no relevance to someone else's measurements made with different units and standards. If the system contains agreed-upon units and standards, measurements made by different people in different places will be uniform and compatible with one another.

When one considers the size of the American industrial economy, the number of measurements made every day, and the high quality of our measurements, it is surprising to learn that the entire system is voluntary. There are no laws that require a manufacturer to make measurements consistent with others' or to adjust his instruments or standards by any agreed-upon

**Taken mostly for granted, our international system of measurement ties one man's idea to another's production line, and to the ultimate user.**

# . . OR IS IT?





norm. Yet every year, industry sends thousands of instruments and standards to the National Bureau of Standards, either in Washington, D. C., or its Boulder, Colorado Laboratories to have them calibrated by the Bureau's scientists and engineers.

For most practical purposes, the United States is on the English system. The yard is 0.9144 meter, and the pound is 0.45359237 kilogram, and the Bureau of Standards provides calibration services to its customers in whatever system they desire. Our standards are linked to the standards of other nations through the International Bureau of Weights and Measures in France.

To physically represent the unit of mass (weight) there is a cylinder of platinum-iridium, which has been very precisely compared with the international kilogram in Paris. To represent the meter, there was, until 1960, a platinum-iridium bar. The distance between two lines inscribed on the bar was one meter. In 1960, the meter bar was replaced by a specified number of wavelengths of light from the element krypton. The standard for time was based for some years on astronomical measurements of the revolution of the earth around the sun. In 1965, a new definition for the second was provisionally adopted based on the vibrations of the cesium atom. The standard for temperature must be created, whenever it is needed, in a glass tube, by bringing water to the point where it exists simultaneously as ice, liquid, and vapor. This "fixed point" is always 0.01 degrees on the Celsius (formerly Centigrade) temperature scale.

**metric?**

From the earliest days of our history as a nation, numerous proposals have been made that our measurements should all be made in the metric system. In 1866, the use of the metric system was made legal in the United States, but not mandatory. In more recent times, there has been renewed discussion of changing to general use of—adopting—the metric system. Scientists in this country already use the metric system generally, while most engineers usually use the English system.

The United States and Great Britain are the only two major nations now using the English system of measurement. There are, of course, conversion tables available for those who must use both systems. Conversion factors are necessary because the meter is slightly longer than the yard, the kilogram is slightly more than two pounds, the liter is slightly larger than the quart, and on the Celsius temperature scale, water freezes at 0° rather than at 32°.

The most useful feature of the metric system is that all its units are divided into ten parts. The simplicity of computing smaller and larger units, and the ease with which one can deal with different units (such as length, temperature, and weight) have always had a special appeal to those favoring adoption of the metric system.

To those involved in international trade, a major consideration is that of "even sizes." When someone has a choice of sizes to make a given object, say a bolt, he will choose an even number—for example, a quarter inch or half inch. The problem is that a nice even number in the English system is not even in the metric. The half-inch bolt would be 1.27 centimeters, a value no one in a metric country would choose if he had free choice. He would rather make it one or two centimeters. So this difference between "even sizes" in the two systems makes the metric system attractive for international trade, in view of the fact that it is used by most of the world's major trading nations.

Depending upon how extensive a changeover is proposed in this country, it could have significant consequences in our daily lives. There are impressive arguments on both sides of the question. In the past few years, legislation has been introduced in the Congress, repeatedly, and proposed legislation has already been reported out of the 90th Congress' House Committee on Science and Astronautics. It follows the lines of legislation (HR 3136) introduced by Rep. George Miller (D-Calif.), the Committee Chairman, to study the impact of increasing world-wide use of the metric system on U.S. industry, and the practicality and costs in-

volved in American conversion.

**bookkeeper**

It is the job of the National Bureau of Standards to maintain the national standards, constantly strive to improve them, and to make the standards available to commerce, industry, and science.

Maintaining and improving the national standards of measurement requires the conduct of basic research and the attainment of a high level of competence in every field of the physical sciences. Making the standards available to the nation's scientific and technological community is accomplished primarily through the process of calibration of instruments and standards sent in by industry, universities, and business.

But there are ways of distributing measurement standards other than through calibration of instruments. For example, when the Bureau measures the melting point of some material, it publishes the resulting number. Then any laboratory can check its own temperature measuring device simply by melting the same material, and measuring the temperature with its instruments.

Perhaps the most unusual method the Bureau uses to disseminate standards is the radio signal. The Bureau's four radio stations which broadcast standard time signals, standard radio frequencies, and standard audio signals are familiar to every technician engineer. These stations have become especially important since satellite space exploration began, with its precise requirements for celestial navigation and tracking. Incidentally, if you care, the NBS one-second pulses on the WWV and WWVH carriers are presently longer than one second, by 300 parts in $10^{10}$.

In 1901, when the National Bureau of Standards was established, it had custody of a meter bar, a Kilogram, and a few electrical standards. Today, it maintains more than 40 national standards of physical measurement, covering such additional quantities as force, light intensity, radiation, and many more.

**big ones and little**

In each case, the Bureau must try to assure that there are standards for the entire range of the particular physical quantity, if there is a need for scientists and engineers to make measurements throughout that range. For example, there must be standards for small lengths, medium-sized lengths, and large lengths, all of them based on the standard of length, the meter. In addition, the Bureau must assure that calibrations can be made with the degree of accuracy required by the Bureau's customers. The constant addition of new phenomena to be measured, new ranges to be covered, and higher accuracies to be attained is what makes measurement a dynamic science, and not a custodial function.

**natural constants**

What would happen if the international kilogram were stolen? Or lost? Or damaged in some way? What if it is changing slowly in time? No one knows the answers to these questions, but to counteract the consequences of any such occurrence, a trend is under way in the field of measurement to replace arbitrary physical standards with standards based on constants of nature or on the unvarying properties of atoms. Thus, the platinum-iridium meter bar gave way to the wave-lengths of light emitted by krypton 86. The irregular revolution of the earth about the sun is being replaced by vibrations of the cesium atom as a standard for time. The standard for temperature, the triple point of water, is already based on a constant of nature. At present, however, there is no natural phenomenon whose weight (mass) can be measured as precisely as we can now compare two kilograms on a balance, and so the matter rests there, until some breakthrough occurs in the state of measurement science.

**electronic precision**

Like the vacuum tube, the transistor presented many challenges to the science of measurement, not only in the field of electricity, but in determining the properties of materials as well. This latter problem was particularly acute in the case of the transistor. The impurity essential to the makeup of a transistor, which might consist of one atom of foreign material for every billion atoms of the base material, had to be precisely measured in order for scientists and engineers to know the electrical characteristics of the base material.

A national measurement system is obviously a great convenience to all of us. The requirements of national defense, space exploration, and international trade, however, make a national measurement system essential. Furthermore, our entire national economy, which produces more goods and services than any nation in the history of the world, is based upon and is absolutely dependent upon a national measurement system of the highest quality.

Through the combined efforts of Government and industry, we have now a measurement system probably as advanced as any in the world. With the increasing internationalization of commerce, however, there seems little doubt that we are going to have to make a changeover to metric measurement. It won't be tomorrow, but the chances are good that it will be within our lifetimes.

# A UNION MEMBER'S DICTIONARY

***A feature series planned to keep you better informed on the meanings of terms related to collective bargaining, union contracts, and union business. Follow it closely, and your union membership will become more meaningful, and your ability to participate in decisions which affect your future and security will be strengthened.***

## *Union Abbreviations, Cross-Indexed*

**AGVA** American Guild of Variety Artists.
**Aircraft Workers**—See UAW, IAM.
**AIW** International Union, Allied Industrial Workers of America.
**Airline Dispatchers**—See ALDA.
**Airline Supervisors**—See RSA.
**Airline Pilots**—See ALPA.
**ALA** Amalgamated Lithographers of America, Ind. (Merged 1964 with Photo Engravers. See IPEU, L&PIU.)
**ALDA** Airline Dispatchers Association.
**ALO** Amalgamated Lace Operatives of America.
**ALPA** International Air Lines Pilots Association.
**Aluminum Workers**—See AWU.
**ANG** American Newspaper Guild.
**ARA** American Radio Association.
**Artists**—See AAAA, AGMA, AGVA, AFTRA, AEA.
**Asbestos Workers**—See HFIA.
**Atomic Workers**—See OCAW, IBEW.
**ATU** Alliance of Independent Telephone Unions. Ind.
**ATU** Amalgamated Transit Union.
**AUA** Associated Unions of America. Ind.
**Automobile Workers**—See UAW.
**AWU** Aluminum Workers International Union.
**AWWU** American Watch Workers Union.

### B

**Bakers**—See ABCW, BCW.
**Barbers**—See BHC.
**Bartenders**—See HREU.
**BBF** International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forgers and Helpers.
**B&CWIUofA** Bakery and Confectionery Workers International Union of America. Ind.
**BFCSD** International Union of United Brewery, Flour, Cereal, Soft Drink and Distillery Workers of America.
**BHC** Journeymen Barbers, Hairdressers, Cosmetologists and Proprietors' International Union of America.
**Bill Posters**—See BPBD.
**Billers**—See BPBD.
**Blacksmiths**—See BBF.
**BLE** Brotherhood of Locomotive Engineers. Ind.
**BPMI** Bricklayers, Masons and Plasterers' International Union of America.
**BMWE** Brotherhood of Maintenance of Way Employees.
**Boilermakers**—See BBF.
**Bookbinders**—See IBB.
**Boot and Shoe Workers**—See BSW, USW.
**Bottle Blowers**—See GBBA.
**BPBD** International Alliance of Bill Posters, Billers and Distributors of the United States and Canada.
**BPBD** Brotherhood of Painters, Decorators and Paperhangers of America.
**Brakemen, Railroad**—See ORCB.
**BRC** Brotherhood of Railway Carmen of America.
**Brewers**—See BFCSD.
**Bricklayers**—See BMP.
**Brick Workers**—See UBCW.
**Bridge Workers**—See BSOIW.
**Broadcast Employees**—See NABET, IBEW.
**Broadcast Technicians**—See NABET, IBEW.
**BRS** Brotherhood of Railroad Signalmen.
**BRSC** Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees.
**BRT** Brotherhood of Railroad Trainmen.
**BSAC** Brotherhood of Shoe and Allied Craftsmen. Ind.
**BSEIU** Building Service Employees International Union.
**BSOIW** International Association of Bridge, Structural and Ornamental Iron Workers.
**BSW** Boot and Shoe Workers' Union.
**Buffers, Metal**—See MPBP.
**Building Laborers**—See HCL.
**Building Service Employees**—See CSEIU.
**Bus Drivers**—See ATU, TWU.
**Butchers**—See MCBW.

### C

**Cap Workers**—See HCMW.
**Carmen**—See BRC.
**Carpenters**—See CIA.
**Carriers, Letter**—See NALC, RLCA.
**Cement Masons**—See OPCM.
**Cement Workers**—See CLGW.
**Ceramics Workers**—See UGCW.
**Chauffeurs**—See CTD, TCWH.
**Chemical Workers**—See ICW, OCAW.
**Cigar Makers**—See CMIU.
**CIO** Committee for Industrial Organizations Congress of International Organizations. See AFL-CIO.

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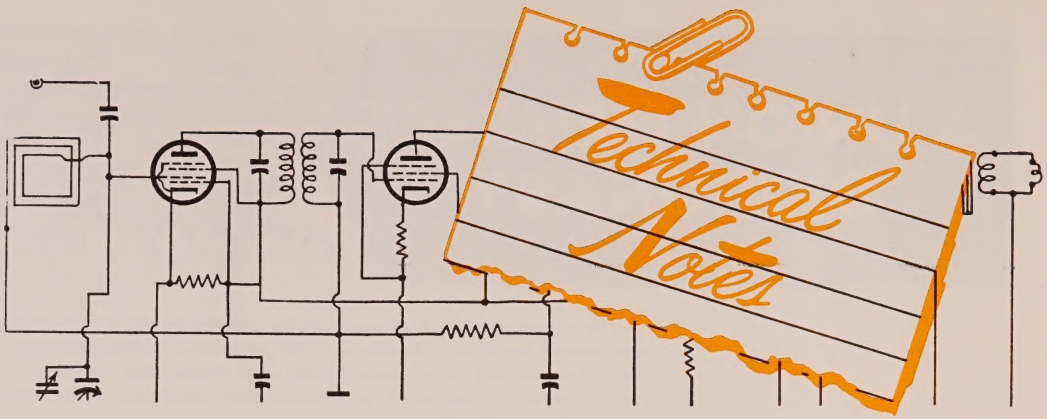



## UNMODULATED CARRIER

Homer Newell, the Associate Administrator for Space Science and Applications at NASA, tells some funny ones about the early days of U.S. rocketry, when we were using "liberated" V-2s to launch our own program.

In one experiment, instrumented spheres were being flung high into space in ballistic trajectory so that their reentry behavior could be measured. The knowledge gained was invaluable in designing heat shields to protect returning astronauts. There was a malfunction in one launch of the test series, and the sphere, already transmitting signals, was prematurely ejected. So prematurely, in fact, that it rolled out on the grounds of the launch complex.

At about this time the crew inside the blockhouse, transfixed by their data displays, noticed they had lost the tracking signal.

It wasn't long before a ground crewman spotted the wandering sphere, and decided to return it to its rightful owners. He opened the door to the blockhouse, carrying it, but found it hard to attract any attention. At that very moment, the technicians were elated by the return of the tracking signal on their monitors, and it took more than several seconds for the reason to dawn on them.

Another event paved the way for an improvement in power supply for the launch complex. It seems that there was this rocket flight which had launched A-OK, and seemed to be going in a perfect trajectory when suddenly the whole blockhouse went dead. Ground power had been completely lost, and after frantic efforts to find the trouble, a culprit was apprehended. No sinister spy, or disgruntled employee, he was the soft-drink machine service man. Anxious to make repairs on the machine, he had pulled the circuit breaker. Coke machine—telemetry and tracking equipment—lights—went out with one swift blow. "It was suggested," Dr. Newell recalls with a wry smile, "that separate circuits be provided for the ground launch facilities."

## SONIC BOOMERS

The Rock-and-Roll percussionists may not be such a harmless nuisance as a lot of old folks thinks. Dr. Robert A. Larabell, a Phoenix, Ariz., sound expert, says that the noise from the "bands" is loud enough to do permanent damage, and if teenagers don't move farther away from the bands, or dampen the youthful musicians' enthusiasm, they may need hearing aids by the time they are young adults. The loudness of rock-and-roll music, he says, equals automobile assembly, drop forging and riveting! Air Force studies say loudness of 90-95 decibels at twenty feet or so can do permanent damage after 15 minutes. The rock-and-roll band equals this.

## SUPER-FAST SWITCH

An electronic switch that can change circuit electrical paths in less than 800 picoseconds (800 one-trillionths of a second) has been developed by an IBM engineer, Juri Matisoo. The superconducting element is designed for use in the logic circuits of computers, but it could have other applications as well. Older switches were absolutely slothful—they could switch in no shorter than 20 or 30 billionths of a second because they had to be alternately switched between normal conductivity and superconductivity states. The engineer's new device is always superconducting, eliminating this problem. It may actually be much faster than 800 picoseconds, he reports. That's the limit of his measurement capability right now.

Rapid switching and capacity is becoming increasingly important in computers. The calculation speed has already begun to be limited by such factors as the length of wires, and this is one reason that computer designers like solid state devices. Their internal circuit paths give a tremendous speed edge over older wired circuits.

## ON THE LEVEL?

There's some evidence that all TV manufacturers have not toed the Government's mark about advertising tube sizes. Although it's been mandatory by Federal law since the first of the year to indicate that tube measurements are diagonal, not horizontal, and that indicated size must be *visible* tube dimensions, a number of manufacturers are reported to be still cheating. A recent

survey showed that many dealers have not complied, and some have slipped the bonds of linear diagonal for square inches, cubic hectoliters, or rhombic pentameters, to further clarify the issue in public mind. The FTC, ever watchful, says it is going to take a look at all promotional literature for TV sets, to spot the backsliders.

## SPINE-TINGLING

Canadian Doctors are reported to be working on a heart pacemaker (impulse generator that triggers natural heart action with tiny bursts of current) powered by the electricity of the human body itself. We've long known about those electrical impulses involved in moving dem bones, and shuffling ideas around in the grey matter, but there is apparently a usable weak current generated by the body. Electrodes in the skin can pick it up, and conduct it to a transformer which turns it into voltage sufficiently powerful to work the pacemaker.

## FM LASER BEAM

A new development in Laser technology may be the key to practical communication with lasers. A Georgetown University physicist, Dr. William J. Thaler, modulates a laser's light output by frequency, rather than amplitude. AM modulation of laser light—the method most often used heretofore in communicating with lasers, is prey to the same kind of problems radio AM is. Interference from other light sources can disrupt the signal.

To modulate the frequency of the laser, Dr. Thaler generates periodic disturbances in transparent liquids or solids by ultrasonic vibrations, or in electro-optical crystals by electromagnetic waves. The periodic disturbances in these materials, in turn, modulate the frequency of laser light by changes in refraction.

## FM GETS A HAIRCUT

Once considered the stronghold of classical music programming, FM has shed some longhair, and programs more popular music than it did in the early days, according to a recent survey by NAB. The Association's Vice President, Sherril Taylor, said the survey results show "a healthy, exciting diversity of program content in FM."

Most (61%) of the stations responding to the survey use music with a broad appeal as their basic programming. Only seven percent based their programming on classical, 5 percent on country-western, 4 percent on top 40, 3 percent on light classical, and 3 percent on Broadway-Hollywood.

## STORM WARNING—HEAVY BIRDS

Pilots flying Canadian airways may soon be getting bird intensity reports as well as severe storm warnings from ground-based radar. Canada's Associate Committee on Bird Hazards to Aircraft is cooperating with the Canadian Air Force in the Development of a system to forecast penetration of migrating birds with radar and photographic techniques. In tests last Spring, the method proved about 83 percent accurate, while in August and September, reliability of the severe bird warnings dropped to about 70 percent. The highest risk of bird strikes, the study has shown, is September, and between sundown and midnight.

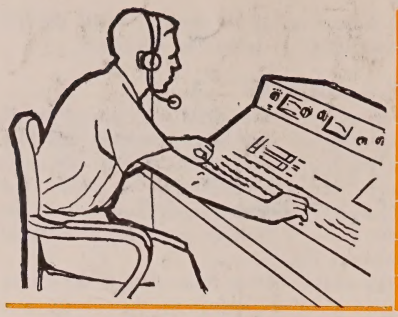
Normally, birds make very faint returns on standard radar screens. Researchers use a 120 minute time exposure of a Polaroid Camera per picture, turning the indistinct bird blips into long smears.

# Not Really Tax Relief

A Constitutional amendment has been proposed for the State of Ohio to provide tax relief for retired people and, at first reading, seems to have considerable merit. However, further examination reveals numerous fallacies and its potential disservice to those it ostensibly was designed to help.

Briefly, the idea proposed is that a fund be set up by the Ohio Bond Commission to pay the real estate taxes of retirees. Since the average retired couple in Ohio has an annual income of about $1,700, payment of real estate taxes is a substantial problem. More than two-thirds of these people own their own homes. If the taxes could be paid by state funds, a great economic burden to people with such limited incomes would be relieved. The basic fault to be found with the current proposal is that the funds spent by the Bond Commission to pay the taxes would constitute a lien against the property, collectible by the State upon the death of the retirees, or upon the transfer of the property. It thus offers immediate real tax relief, but can be likened to the property being mortgaged to obtain the money necessary to pay the taxes.

For some years the Ohio AFL-CIO has urged legislation which would freeze tax rates on the assessed evaluation of a retiree's home up to $5,000 —provided that the retiree makes the property his home. The organization points out that it is cruel to offer illusory tax relief in the form of a lien and to thus deprive retirees of the ownership of their homes. Since such retired people are on fixed incomes, with little or no hope of any substantial increase in income in the future, they are simply unable to afford the ever-increasing cost of taxes of all kinds and real estate taxes, in particular.



# STATION BREAKS

## IN-HOUSE FCC PROGRAM CRITIC

FCC Commissioner Nicholas Johnson, the 32-year-old Democratic whiz-kid who moved to the FCC from a hot seat in the Maritime Administration within the last year, has been verbally rapping the knuckles of his colleagues over what he thinks is rubber-stamp approval of station license renewals. Johnson feels a more jaundiced eye is needed toward programming that doesn't include at least some news, and perhaps some inspirational programming. The storm whipped up around an FCC staff action renewing the licenses of five Florida stations—WOGN, Miami,, WDCJ, Arlington, WOGO, New Smyrna Beach, WONS, Tallahassee, and WFFG, Marathon, although Johnson criticized issuance of license renewals for a total of 206 AM stations. He notes that two of the stations proposed no news programming and seven proposed no public-affairs programming. Before licenses are renewed, Johnson said, further inquiry should be made to find out how well the stations are serving their communities. Also criticizing the Commission was Commissioner Kenneth A. Cox, who agreed that the news and inspiration content of the proposed station programming was so low that it warranted further examination.

In an interview over Station WNEW, New York, Commissioner Johnson said he thought getting local area groups into the station-licensing process would contribute to the public service role of the stations. He also criticized the FCC for failing to play a creative role in the educational television picture. He applauded the initiative taken by the President, and others like the Ford Foundation, Carnegie Commission and the National Association of Educational Broadcasters, but said the FCC "Has not really contributed much in the way of a substantive report of a quality and content comparable to that of Ford or Carnegie."

## PRESIDENT'S ETV PLAN

The proposals of President Johnson for some form of Federal aid for ETV may be the fruit of the original Ford plan. It was the Ford Foundation's concept for a satellite network plan, with financial spin-off to help ETV, that broke loose a lot of the public discussion of the need for assistance. The President's plan would create a Corporation for Public Television using both public and private funds to improve non-commercial television and radio. It would be governed by a 15-member board named by the President from "leaders in education, communications and the creative arts."

One of the corporation's first jobs, the President suggested, would be a study of the practicality of using communication satellites to establish an educational television and radio network. It would operate as a foundation, making grants to help stations overcome present "serious shortages of the facilities, equipment, money and staff they need to present programs of high quality." The initial money Mr. Johnson asked was $9 million.

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**16TH ANNUAL PROGRESS MEETING**

**PORTLAND, OREGON**

**AUGUST 18-19-20, 1967**

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## LAST LAUGH